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FOREST PEST CONDITIONS

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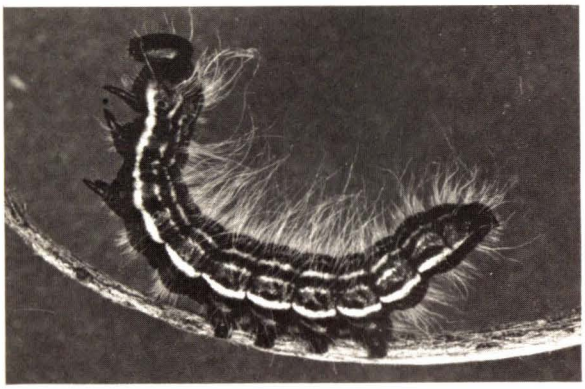

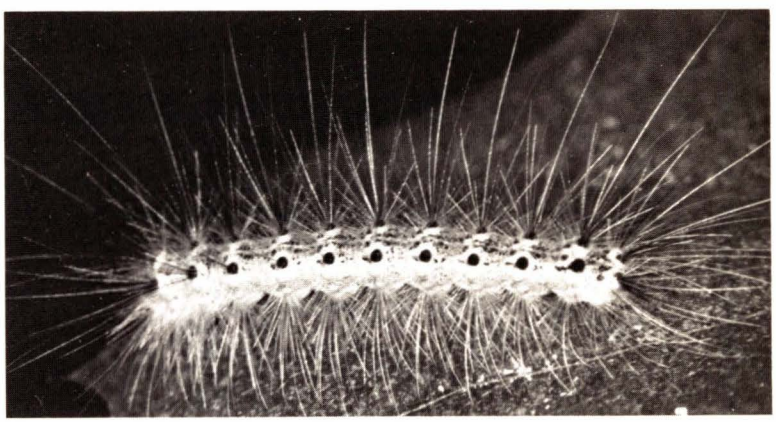

compiled by

U.S. DEPT. of AGRICULTURE, FOREST SERVICE
NORTHEASTERN AREA, STATE and PRIVATE FORESTRY
UPPER DARBY, PA.

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COVER PHOTO: Top, walnut caterpillar; bottom, Nectria canker on black walnut; right, fall webworm.

FOREST PEST CONDITIONS — 1971

by James B. Hanson and William Lautz*

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Material was compiled from information submitted by federal, state, and private cooperators in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia and Wisconsin. Editorial assistance was provided by W. F. Vartorella.

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CONDITIONS IN BRIEF—1971

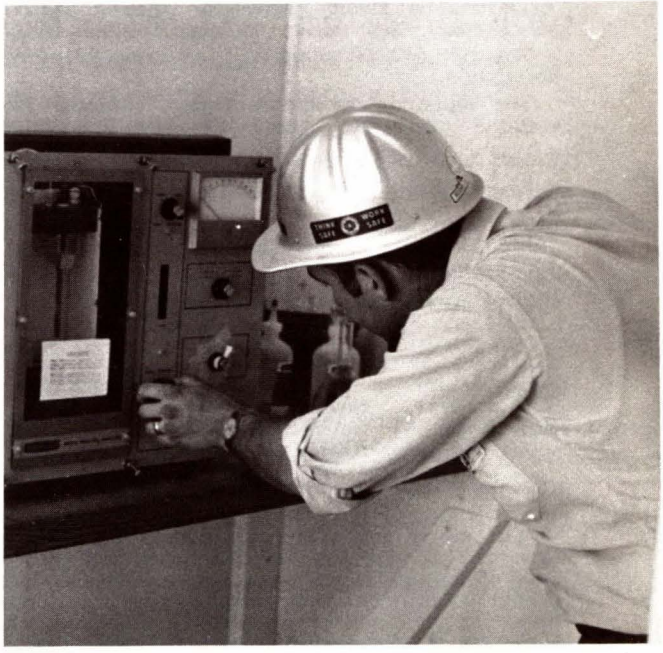
Hardwood defoliators were the major insect pests in the northeastern states in 1971 where they defoliated more than 8 million acres of forested land. The gypsy moth gained specific attention by defoliating 1.4 million acres; states receiving the most damage were Connecticut, New York, New Jersey, and Pennsylvania. The area treated by state organizations in cooperation with the U.S. Forest Service for this pest comprised 319,400 acres. Infestations of the variable oakleaf caterpillar continued for the second year, defoliating 2 million acres in southeastern Missouri. Populations of an oakworm maintained high levels and defoliated 1.3 million acres in four states. Michigan and Minnesota were the most severely affected. The saddled prominent infestation which has plagued seven eastern states for the past several years, appears to be declining. Approximately 570,000 acres were defoliated by the saddled prominent with most defoliation occurring in New Hampshire and Maine. Leaf rollers continue to damage oak stands in Pennsylvania where 1 million acres were defoliated. *Archips semiferanus* was the dominant leaf roller in the complex. The large aspen tortrix infestation in Minnesota increased to 2 million acres of heavy defoliation. Infestations are also reported in Michigan and Wisconsin. A recurring insect problem, the forest tent caterpillar, caused more than 400,000 acres of defoliation in Minnesota and Pennsylvania this past season.

The spruce budworm continued to be the most important conifer pest. Minnesota and Maine sustained most of the 4.5 million acres of defoliation. In Maine, 10,000 acres were treated with Zectran. Pennsylvania Environmental Department entomologists reported substantial defoliation of hemlock by the budworm. The southern pine beetle continued to cause pine mortality on the eastern shore of Maryland. Other notable pests causing conifer damage in 1971 were the jack pine budworm, jack pine sawfly, pine looper, and the balsam woolly aphid.

Many of the tree diseases which have caused alarm in the past have become stabilized or have had reduced impact. Two exceptions were the needle cast fungi, which caused increased damage during 1971 in forest nurseries and Christmas tree plantations, and *Lophodermium pinastri* which caused losses in Scotch pine.

Landowners and service foresters are becoming more aware of the problem of air pollution (Fig. 1). This has resulted in more efficient surveillance and a larger number of damage reports. Christmas trees are particularly vulnerable because appearance is a prime consideration in value. In the upper Potomac Valley in Maryland and West Virginia, thousands of trees were discolored and deformed by sulfur dioxide and dissolved particulate matter. In Missouri, leaf necrosis was observed in the vicinity of lead mines, probably caused by sulfur dioxide and acid mist.

Figure 1.—Forest Pest Management personnel are cooperating with other agencies to monitor the environment for air pollutants.



STATUS OF INSECTS

Gypsy moth

Porthetria dispar (L.)

The gypsy moth continued its upward population trend, and defoliation occurred on approximately 1.4 million acres of forested land in 1971 (Table 1). States which received the heaviest damage were Connecticut, New Jersey, New York, and Pennsylvania. The defoliated acreage was 1.5 times greater than that reported by the Plant Protection Division in 1970.

Table 1.—*Comparison of gypsy moth defoliation in the Northeastern Area for 1970 and 1971*[1]

States	Acres defoliated	
	1970	1971
Connecticut	386,700	655,100
Maine	1,080	820
Massachusetts	6,800	18,800[2]
New Hampshire	38,500	3,300
New Jersey	129,800	180,600
New York	416,300	479,150
Pennsylvania	10,500	89,000[2]
Rhode Island	1,100	8,500
Vermont	—	4,500[3]
Total acreage	990,780	1,439,770

[1]Data from Plant Protection Division, APHIS, Moorestown, New Jersey. October 19, 1971.

[2]Another 500,000 acres had less than 60 percent defoliation.

[3]An undated defoliation record obtained from state.

Table 2.—*Acres treated by state organizations in cooperation with the U.S. Forest Service for the control of the gypsy moth in 1971*[1]

States	Insecticide	Acres treated
Pennsylvania	Sevin 4 Oil	23,000
New Jersey	Sevin Sprayable	55,000
New York	Sevin Sprayable	241,000
	Dylox 80% SPA+Oil	400
Total acreage		319,400

[1]The use of trade, firm, or corporation names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U.S. Department of Agriculture of any product or service to the exclusion of others which may be suitable.

The purpose of spraying to suppress the gypsy moth is to provide temporary foliage protection and consequent maintenance of tree vigor in areas where tree values are high for recreation, esthetic, and similar purposes. In 1971, in the Northeastern Area, 372,000 acres were treated in high-use areas where tree values were imminently threatened by the gypsy moth (Table 2). The insecticide Sevin (carbaryl) was used in all states with the exception of pilot tests with Dylox in New York.

The gypsy moth has caused extensive damage in the Northeast since its introduction into Massachusetts in 1869. Natural control factors which hold many native insects in balance have often lagged far behind massive outbreaks of the gypsy moth (Fig. 2). Damage by the insect may be exhibited by loss of current foliage, outright tree mortality both directly and indirectly attributed to the defoliation, loss of tree vigor, loss of forest ownership values, and the direct monetary loss of removing dead trees.

Figure 2.—Egg mass of the gypsy moth which has been parasitized by *Ooencyrtus kuwanai*.

Disparlure is the synthesized female attractant of the gypsy moth. One use of the attractant is as a detection tool. Traps baited with disparlure are used in previously uninfested areas to attract males and thereby discover any incipient population buildups. This year male moths were trapped in Fulton and Ashland Counties in Ohio and in Monroe County, Wisconsin. This is the first record of the gypsy moth in Wisconsin. Traps placed in Michigan where a previous infestation was considered eradicated, and in West Virginia adjacent to outbreaks in neighboring Pennsylvania, failed to capture any male moths.

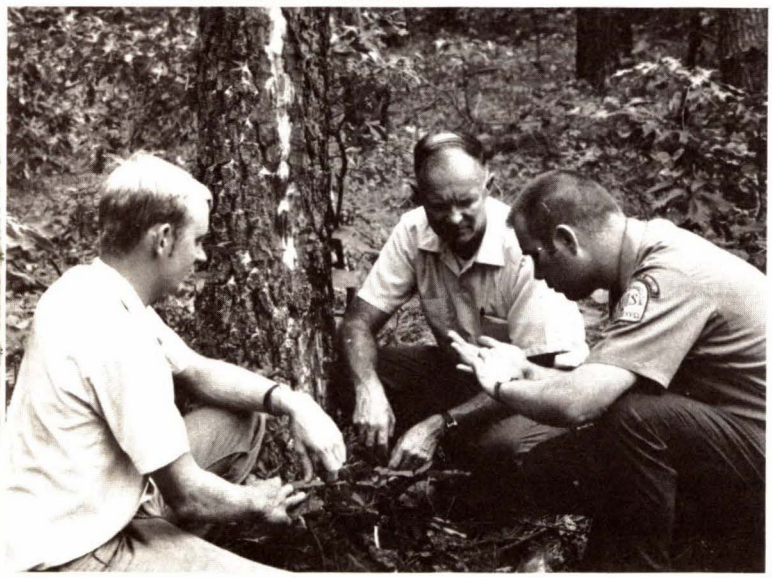
The populations of the gypsy moth are expected to continue on their upward trends in 1972.

Spruce budworm

Choristoneura fumiferana (Clemens)

The extensive outbreak in northern Minnesota continued for the fifth year with more than 2 million acres defoliated. In Wisconsin, an area of 8,000 acres of white spruce, black spruce, and balsam fir was lightly defoliated.

Figure 3.—State forestry officials and Forest Service entomologist evaluate the southern pine beetle effect on loblolly pine of the Delmarva Peninsula.



Local infestations have declined in lower Michigan but have increased in upper Michigan where severe defoliation is expected to occur in 1972. In 1971, the U. S. Forest Service in cooperation with Maine Forestry Department treated 10,000 acres with Zectran and reported a mean larval mortality of 96 percent. Maine currently has 2.5 million acres of spruce-fir type infested with the budworm. Populations are expected to continue at high levels and Maine forestry personnel anticipate the need to treat 500,000 acres of heavily infested spruce-fir type with Zectran in 1972. No suppression projects are planned for the Lake States this year.

Pennsylvania Department of Environmental Resources entomologists reported 52,000 acres of hemlock defoliated by the budworm, an increase from 200 acres defoliated last year. Mortality will likely result in many of the heavily defoliated areas.

Southern pine beetle

Dendroctonus frontalis Zimmerman

The southern pine beetle continues to cause considerable loblolly pine mortality on the Delmarva Peninsula in Delaware and Maryland (Fig. 3). Worcester County, Maryland, had the highest incidence of beetle activity, with 16 spots or groups of infested trees per 1,000 acres host type. The total number of fading trees on these spots was 80. The typical stand being attacked by the beetle is approximately 35 years old, has reduced growth, has dense stocking, is found on poorly drained soils, and has undergone below normal precipitation.

Variable oakleaf caterpillar

Heterocampa manteo (Doubleday)

The massive populations of this pest in southeastern Missouri continued, defoliating 2 million acres in 1971. The size of the population increased while coalescing and causing heavy defoliation in the area where the pest was found in 1970. Defoliation in 1971 was particularly severe on oak and basswood (Fig. 4). A small infestation of this insect was also detected in Maryland.

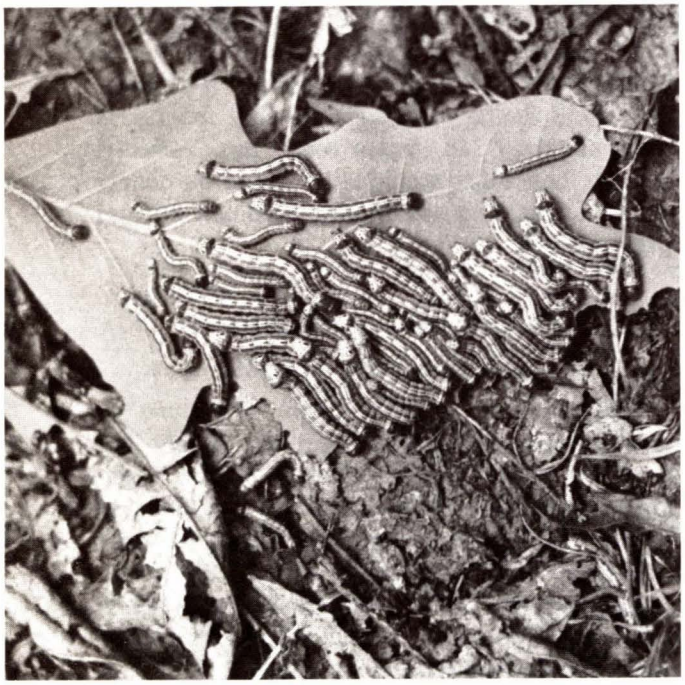
Figure 4.—A larva of the variable oakleaf caterpillar shown feeding on oak.

Oakworm

Symmerista canicosta Franc

Infestations of this pest were reported in states where it defoliated 1.3 million acres in 1971 (Fig. 5). Defoliation from affected states was as follows: Minnesota 725,000 acres; Michigan 604,000 acres; Wisconsin 1,000 acres, and Iowa 100 acres. Populations are expected to continue at high levels in 1972. The state organizations involved do not anticipate any suppression action, but undoubtedly private landowners will treat high value areas.

Figure 5.—Colony of *S. canicosta* shown feeding on oak.



Saddled prominent

Heterocampa guttivitta (Walker)

Local populations of the saddled prominent declined drastically in Massachusetts, New York, Pennsylvania, and Vermont, but increased in New Hampshire and Maine in 1971 (Table 3). The overall acreage defoliated remained high, however, totaling more than 500 thousand acres. The Pennsylvania Pest Reporter reports 10 percent host tree mortality over 5,000 acres with tree dieback occurring over another 2,000 acres as a result of the previous year's saddled prominent defoliation. Mortality of yellow birch is showing up in New England areas which supported two or more years of defoliation.

Table 3.—*Comparison of saddled prominent defoliation in the Northeastern Area for 1970 and 1971*

States	Acres defoliated	
	1970	1971
New Hampshire	480,000	493,000
Maine	12,000	26,000
New York	89,000	26,000
Massachusetts	125,000	23,000
Pennsylvania	50,000	2,000
Vermont	136,000	—
Total acreage	892,000	570,000

Large aspen tortrix

Choristoneura conflictana (Walker)

The infestation in Minnesota increased to 2 million acres of heavily defoliated aspen. An additional 2 million acres were lightly defoliated. Scattered infestations of this insect also have been reported from upper Michigan, northern Wisconsin, and Isle Royale National Park in Lake Superior.

Oakleaf roller

Archips semiferanus (Walker)

The massive outbreak of this defoliator continued to play havoc with oak stands in Pennsylvania where it defoliated more than a million acres. Last year an estimated 5.5

million trees were killed by this insect. In some counties oak mortality was 90 percent where three successive years of defoliation had occurred. Pennsylvania State University scientists have isolated the *Archips* sex attractant material which may well lead to an improved survey or control method in future years. An oak leaf roller control project was conducted at Black Moshannon State Park, Pennsylvania, on 2,200 acres using Sevin 4 Oil.

Jack pine budworm

Choristoneura pinus Freeman

In northwestern Wisconsin, 30,000 acres were defoliated to various degrees by this pest in 1971. Scattered infestations in east-central Minnesota caused some defoliation. Budworm populations are increasing in lower Michigan. No suppression projects are planned for 1972.

Forest tent caterpillar

Malacosoma disstria Hübner

A widely distributed and recurring insect problem, the forest tent caterpillar, once again caused considerable defoliation in the Northeastern Area. Minnesota state entomologists reported 225,000 acres of aspen defoliated, while Pennsylvania reported 205,000 acres of oak defoliated by this pest. Ohio and West Virginia surveys indicated noticeably light defoliation on oak, a decline from the heavy defoliation of the forests exhibited in 1970. In Missouri, this was the first record of the insect causing defoliation in more than 75 years. Pennsylvania Department of Environmental Resources treated 1,700 acres in Prince Gallitzin State Park with Sevin 4 Oil.

Jack pine sawfly

Neodiprion pratti banksianae Rohwer

Approximately 30,000 acres of mature jack pine in upper Michigan were severely damaged by the sawfly in 1971. An additional 60,000 acres of mixed pine stands showed moderate defoliation. The sawfly was also observed in lower Michigan where it fed primarily on smaller-sized jack pine.

Balsam woolly aphid

Adelges piceae (Ratzeburg)

This aphid, usually a problem only in Maine, has been reported causing tree mortality in Vermont. Scattered mortality exists over 14,000 acres in Vermont.

Saratoga spittlebug

Aphrophora saratogensis (Fitch)

Approximately 300 acres were treated in Wisconsin with Malathion ULV in 1971. Scattered severe infestations occurred in upper and lower Michigan, but increases in some populations did not develop because of lack of moisture or high temperature. Several small infestations were also reported in Maine and New Hampshire.

Aborvitae leafminer

Argyresthia thuiella (Packard)

This leaf miner is causing mortality of northern white cedar in central and northern Vermont. High populations also exist in Maine.

Elm spanworm

Ennomos subsignarius (Hübner)

Scattered infestations were reported in New York and Connecticut in 1971. Some areas were defoliated by both the gypsy moth and the elm spanworm. Outbreaks of the spanworm in Massachusetts and Wisconsin have declined.

Satin moth

Stilpnotia salicis (L.)

An outbreak of this tussock moth continued in Maine during 1971 where it defoliated more than 9,000 acres of aspen. The population is much reduced from 1970. A further reduction in damage is anticipated for 1972.

Cherry scallop shell moth

Hydria prunivorata (Ferguson)

This relatively obscure insect made an unusual upsurge this year and was reported in Maryland, Massachusetts, Michigan, New

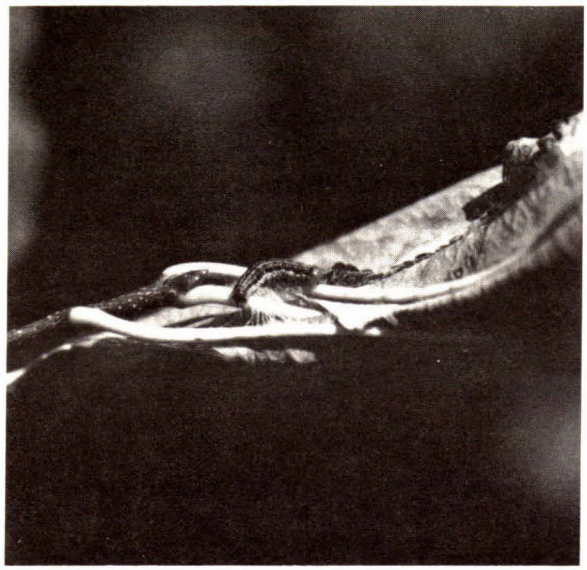


Figure 6.—Cherry scallop shell moth larva; populations of this insect caused heavy defoliation in seven states.

York, Ohio, Pennsylvania, and West Virginia (Fig. 6). New York reports indicated 167,000 acres were defoliated while in Pennsylvania 10,000 acres were heavily or completely defoliated. This insect attacks black cherry and feeds by webbing leaves together and enveloping them within a nest.

Hemlock looper

Lambdina fiscellaria (Guenée)

A local outbreak of this looper was reported on 1,000 acres in southeastern Massachusetts. A small portion of the infestation was treated with Malathion ULV.

Pine looper

Lambdina athasaria pellucidaria (Grote & Robinson)

The pine looper was found in Delaware in August where it moderately or heavily defoliated 1,000 acres of Virginia pine. On Cape Cod, the looper defoliated 11,000 acres. A small infestation was reported also in Connecticut.

Maple trumpet skeletonizer

Epinotia aceriella (Clemens)

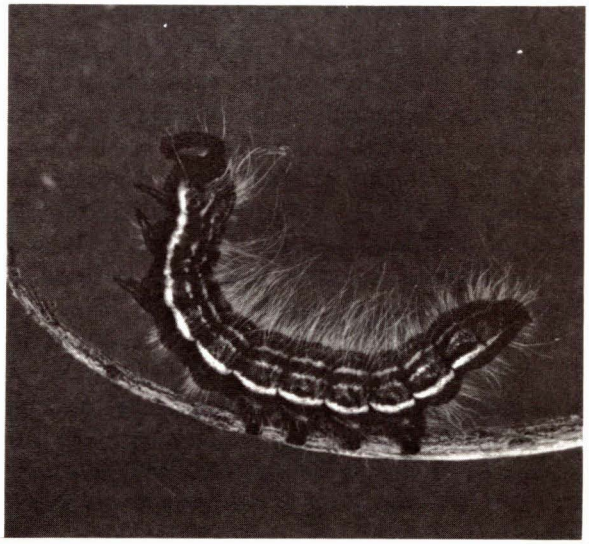
Infestations by this insect were reported in Maine, New York, Pennsylvania, and Vermont. This skeletonizer, because it is a late season defoliator, is not expected to pose a serious threat to maple stands.

Walnut caterpillar

Datana integerrima Grote & Robinson

Localized infestations were observed in southeastern Missouri where the caterpillar caused localized heavy defoliation of plantation and native walnut trees (Fig. 7). Other infestations were reported in Maryland and Ohio.

Figure 7.—The walnut caterpillar shown here is a recurring pest problem on plantation and native black walnut in Ohio and Missouri.



Pine leaf chermid

Pineus pinifoliae (Fitch)

Galls caused by this insect were abundant on red spruce throughout southern and central Maine. Flagging on the chermid's alternate host, white pine, will be evident in 1972, especially where spruce and pine intermix.

Pine root collar weevil

Hylobius radicis Buchanan

This weevil is a pest of young pine plantations and is especially damaging to Scotch pine Christmas tree plantings in Michigan, Minnesota, and Wisconsin. Apparent resistance has been noted in most southern European varieties of Scotch pine, which are also the most desirable for Christmas trees.

European pine sawfly

Neodiprion sertifer (Geoffroy)

This sawfly was widespread in Ohio and Illinois in 1971. Red, Scotch, and white pine in northern Ohio had defoliation that was often severe. Illinois generally had lighter populations than 1970 with Christmas tree plantations receiving the most defoliation. Michigan also reported high populations in Christmas tree plantations in 1971.

Loblolly pine sawfly

Neodiprion taedae linearis Ross

Missouri reported moderate to heavy defoliation on shortleaf pine in the southeastern portion. Illinois reports noted an increase in the loblolly pine sawfly populations with both younger and older stands receiving defoliation (Fig. 8).

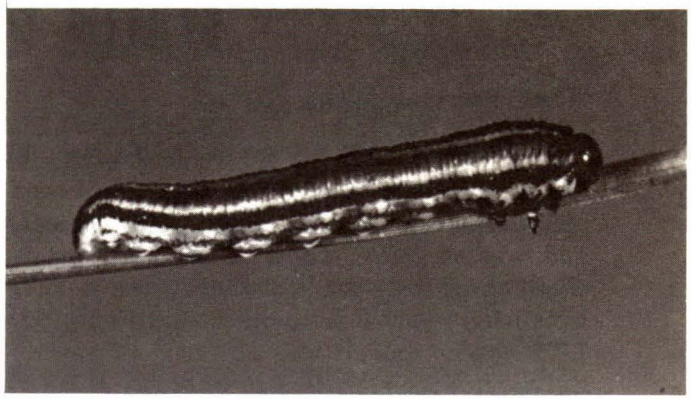


Figure 8.—Larva of the loblolly pine sawfly, a pest of Christmas tree plantations in Missouri and Illinois.

Bagworm

Thyridopteryx ephemeraeformis (Haworth)

Damage to ornamental plantation conifers was reported in Ohio, Illinois, and Missouri again in 1971. In some areas, populations were heavy enough to cause dieback and mortality of coniferous shrubs.

STATUS OF DISEASES

Annosus root rot

Caused by *Fomes annosus* (Fr.) Cke.

Tree mortality is severe in some coniferous plantations in Rhode Island, Connecticut, and eastern New York; total mortality is about three trees per acre. Only a few reports have been received from other states (Fig. 9). Little or no spread was observed at several known infection centers in Indiana, thinned in 1963 and 1964. The first reported finding of *Fomes annosus* in Iowa was in jack pine on the Stevens State Forest of Lucas County.

White pine root decline

Caused by *Verticicladiella procera* Kendrick

An aerial photo survey with subsequent ground checking of 2,000 acres of pure and mixed white pine in northern Ohio found a total of 26 root decline-infected white pine trees. Red pine infected by the same fungus was found in Ohio and New England but is apparently less susceptible than white pine.

Figure 9.—*Fomes annosus* infection center is shown following thinning of a 25-year-old shortleaf pine plantation in Missouri.

Armillaria root rot

Caused by *Armillaria mellea* Vahl ex Fr.

The shoestring fungus was found associated with mortality of red spruce in the Green Mountain National Forest in Vermont. Overcrowding of the stand may have been a predisposing factor. Incidence of tree mortality from this fungus increased in 1970 and 1971 in northeastern Wisconsin and Minnesota where drought occurred.

Cylindrocladium root rot

Caused by *Cylindrocladium scoparium* Morgan

This rot has caused severe red pine seedling losses in nurseries in southern Michigan and red pine and spruce seedling losses in a Minnesota nursery. Some white pine stock for the blister rust resistance program was lost.

Oak wilt

Caused by *Ceratocystis fagacearum* (Bretz) Hunt

In West Virginia, about 3,000 oak wilt-infected trees were treated, compared to 2,558 in 1970. Nearly all the increase was in the northeastern panhandle. In Pennsylvania, wilt incidence was about the same as 1970, about 1,000 dead trees, chiefly in five counties in the southcentral portion. Most of the trees were found in the period from mid-July to mid-August. A few reports were received from Ohio, Indiana, western Maryland, and Minnesota.

Dutch elm disease

Caused by *Ceratocystis ulmi* (Buism). C. Moreau

In most municipalities, Dutch elm disease killed about the same number of trees in 1971 as in 1970. At least 80,000 trees were killed in Chicago. Other cities had comparable losses, amounting to 1 to 3 percent of their elms. In some places, incidence has leveled

off because trees are scattered and fewer are available for infection. In five additional counties in Minnesota and one additional county in Michigan and Wisconsin diseased elms were reported. Most of the large American elms in Iowa and the southern part of Michigan have died.

Elm phloem necrosis

Probable cause, a mycoplasm

Because of difficulty in identification and its similarity to Dutch elm disease, no estimate of distribution and of spread of this disease was made. Dozens of infected trees were found in southcentral New York, and an eastward spread is expected.

Anthracnose

Caused by species of *Gnomonia, Gloeosporium, Marssonina,* and others

Little change from 1970 was observed in incidence of anthracnose on shade trees. Widespread occurrence continued on sycamore, white oak, and ash in eastern Pennsylvania. Hickory and buckeye leaf blotch appeared to be heavier than last year in West Virginia.

Chrysomyxa needle rust

Caused by *Chrysomyxa ledicola* (Pk.) Lagh. or *C. ledi* (Alb. & Schw.) deBary

This rust caused severe defoliation of black spruce in the northeastern portion of Minnesota where the host is commonly harvested for Christmas trees.

Lophodermium needle cast

Caused by *Lophodermium pinastri* (Schrad) Chev.

This fungus, since 1966, has been causing notable losses in forest tree nurseries in the Lake States. Red and Scotch pine seedlings are often killed or severely damaged. In 1971, increased damage to Scotch pine Christmas tree plantings was reported. Positive identification was made from samples received from the Lake States, Vermont, Pennsylvania, and West Virginia.

Rhizosphaeria needle rust

Caused by *Rhizosphaera kaklhoffi* Bub.

Several spruce with this disease have been observed in Wisconsin and Minnesota Christmas tree plantations.

Other needle blights

Other needly blights caused by species of *Hypoderma, Elytroderma, Dothistroma, Scirrhia,* and *Rhabdocline* result in scattered damage to nurseries and Christmas tree plantations each year. Approximately 3,000 acres of Scotch pine Christmas trees were damaged during each of the last few years by *Schirrhia acicola* (Dearn.) Siggers in Wisconsin. A possible Rhabdocline-resistant strain of Douglas-fir is being tested in Vermont.

White pine blister rust

Caused by *Cronartium ribicola* Fischer

White pine blister rust essentially has stabilized during the last few years. Occasional severe incidence occurs in New York and northern New England. In 1971, Pennsylvania reports noted no blister rust in stands that were large enough for evaluation.

Beech bark disease

Beech bark disease is caused by a combination of a scale insect *Cryptococcus fagisuga* Lindinger and a fungus *Nectria coccinea* var. *faginata* Lohman et al. Annual mortality of trees from this complex is estimated at 12 million board feet in Vermont. The killing front extends into western Massachusetts and northeastern New York. The scale, but not the fungus, has been found in northcentral Pennsylvania; county surveys indicated the occurrence of the complex in northeastern Pennsylvania.

Scleroderris canker

Caused by *Scleroderris lagerbergii* Gremmen

Scleroderris has spread from New York into northern Vermont, where losses are increasing in Christmas tree plantations. A 1971 survey of 33 Minnesota plantations re-

Figure 10.—This red pine stem exhibits scleroderris canker and associated loose bark.

vealed seven additional plantations infected to a high degree (Fig. 10).

Hypoxylon canker of aspen

Caused by *Hypoxylon pruinatum* (Klotsche) Cke.

A large and undetermined amount of aspen is damaged every year by this canker. Researchers at Michigan State University are conducting a survey to determine disease severity and value loss.

In southwest Wisconsin and northeast Iowa, a butternut fungus caused losses up to 80 percent in some areas in 1971.

Deerskin droop

A relatively new problem in red pine, a droop of needles (sometimes called "Deerskin droop") has been increasing in northern Minnesota and Wisconsin. Extent and cause of the problem are being investigated (Fig. 11).

Figure 11. — Commonly called Deerskin droop, this disease causes the wilting of terminal branches.

Dieback

Dieback or decline is caused by combinations of previous defoliations, root problems, drought, unsuitable site, and other factors. Fewer reports of this type of disease were received in 1971. Test plots of white ash in Pennsylvania showed that dieback in these plots was tapering off. Trees were dying at a slower rate in 1971 than in previous years.

A shoot blight of red pine has been reported in northeastern Wisconsin for about ten years and more recently in Michigan and Minnesota. Blight symptoms are dead current shoots, often with drooping needles. Both small and saw-timber sized trees are affected. In 1971, increased incidence of spread was noted in Minnesota and Wisconsin. An evaluation is in progress and an investigation to find the cause has begun.

Air pollution damage

Air pollution damage is caused by ozone, sulfur dioxide, smog (PAN), and other toxic gases. Damage symptoms often resemble those caused by nutrient deficiencies, soil toxicity, drought, and scorch. Some of the

symptoms are the following: in conifers mottling of needles and uneven needle length (Fig. 12 & 13); in hardwoods, chlorosis and browning with patterns depending on the pollutant, the species of tree, and temperature and humidity levels. Most of the more obvious cases are caused by SO_2 as a product of the burning of coal. This type of damage has been found again this year in the upper Potomac Valley.

Figure 12.—A wide variety in needle length is a characteristic of some pollution-damaged trees, as in this example of Scotch pine.

Figure 13.—Another symptom of air pollution is mottling of needles. Arrow indicates mottle pattern on Virginia pine.

More detailed information can be obtained by writing to:

Division of Forest Pest Management
U. S. Forest Service, NA-S&PF
6816 Market Street
Upper Darby, Pennsylvania 19082
Phone: 215/352-5800 Ext. 284

Or from the following Field Offices serving the states of:

Delaware Field Office

Division of Forest Pest Management
U. S. Forest Service, NA-S&PF
PO Box 365, 359 Main Road
Delaware, Ohio 43015

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Portsmouth, New Hampshire 03801

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